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FIREPROOFING
CHRISTMAS TREES

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LEAFLET No. 193

Reduce the Holiday Fire Hazard

THE CHRISTMAS TREE has long been recognized as a fire hazard, yet it seems that no organization has collected statistics on the subject. But perhaps it is sufficient to quote a representative of the National Board of Fire Underwriters who says "the hazard is very great, particularly due to the fact that many people retain their Christmas tree too long, and every day it is in the house increases the danger as it dries out." The same representative calls attention to some other factors that add to this holiday hazard, such as makeshift lights with unapproved electric strings, some of them having poor-quality wire, wrong method of inserting lights in the line, and improper sockets. He calls attention to sockets in which the brass part comes flush with the outside, thus making it possible for the metallic tinsel used for decoration on trees to cause short circuits. He says some people still use ordinary candles for lighting the tree, that many are careless in placing it too near a fireplace, and that the use of ordinary nonfireproof cotton under the tree is common. A good grade of fireproof cotton is now on the market and is obtainable at some stores.

Caution

While the methods given in this leaflet, if followed carefully, will reduce the fire hazard of Christmas trees, it should be borne in mind that no inexpensive method is known that will make a Christmas tree completely fireproof. It is cautioned that even when a tree is made fire resistant by the methods described in this publication, lighted candles, matches, and other open flames should be kept from it.

FIREPROOFING CHRISTMAS TREES

By MARTIN LEATHERMAN, *associate chemist*, Naval Stores Research Division, Bureau of Agricultural Chemistry and Engineering

A Christmas tree is a serious fire hazard. The risk is especially great where a large tree is used at a public gathering place, such as a school or church.

A freshly cut tree does not ignite easily because of the moisture present; but the moisture soon evaporates, and the tree becomes dry. When a tree is dry, it catches fire easily. This is especially true of Christmas trees because they contain resinous substances that are easily ignited. The Christmas tree can be made practically fireproof, however, by replacing the moisture with a fire-resisting substance.

A living tree draws up water and dissolved mineral matter from the soil through its roots. If the stem or trunk of the tree is cut off above the ground and the cut end placed in water while the needles or leaves are still able to evaporate water brought to them from the stem, the cut end takes up relatively large quantities of water. This water-absorbing power permits the introduction of dissolved substances into the tree after it has been cut. These circulate through the tree and are carried into the foliage. Certain species of evergreen trees used for Christmas trees, for example the Norway spruce, drop their needles easily. Once the needles have become loosened, they are no longer able to evaporate water brought to them through the stem, and the tree as a whole loses its power to take up a flameproofing solution. The needles of other species, for example certain pines, are not dropped so readily, and these trees appear to retain their power to evaporate moisture for long periods after cutting. With any given species the length of time after cutting during which the tree will retain its ability to absorb water or solution will vary with the conditions to which it has been subjected, such as exposure to wind, high temperature, and sunlight.

Fire-Resisting Chemicals

Certain chemicals render wood, pine needles, and other flammable materials resistant to fire. Ammonium sulfate is about the best. It is cheap, effective, and easily obtained. Calcium chloride is also effective and cheap, but not so readily obtained in a small quantity as ammonium sulfate. The fire-resisting quality of calcium chloride lies in its capacity to hold water. This characteristic makes it ineffective when the air in a room is very dry.

Ammonium sulfate can be bought from most stores that sell seeds and fertilizers. Usually this material contains impurities that cause the solution to appear turbid or muddy, but this does not render it unfit for use. Calcium chloride is usually sold only in 100-

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pound bags by building-supply dealers. However, if a demand existed for this chemical in small quantities, it could easily be put up in small, moisture-proof packages. It should not be kept in the home through the summer as it absorbs moisture freely from the air in damp weather, even when kept in so-called moisture-proof bags, and the moisture causes the chemical to melt.

Applying the Treatment

The method for making a Christmas tree fire resistant is as follows: (1) Weigh the tree and divide the weight in pounds by 4. This will give the weight in pounds of the ammonium sulfate needed. (2) Place the ammonium sulfate in a glass jar, tin pail, or earthen crock, and dissolve in water, using 1½ pints of water for each pound of ammonium sulfate. A narrow-mouth container is preferable as it lessens evaporation of the solution. (3) Just before treating, saw off the stem of the tree about an inch from the end, preferably at an oblique angle or in a V shape, in order that the chemical solution may have free access to the fresh wood at the cut end. (4) Set the tree in the solution in a cool place away from direct sunlight and leave it there until most of the solution is absorbed. For best results the treatment should be given at a moderate temperature—55° to 65° F.—before the tree is placed in a warm dry room, because the solution is not taken up satisfactorily when the atmosphere is warm and dry. Also, the foliage appears to retain its green color longer when treated at this temperature.

Saw off the stem of the tree at an oblique angle.

If calcium chloride is substituted for ammonium sulfate it should be used in the same proportions and in the same way as the ammonium sulfate.

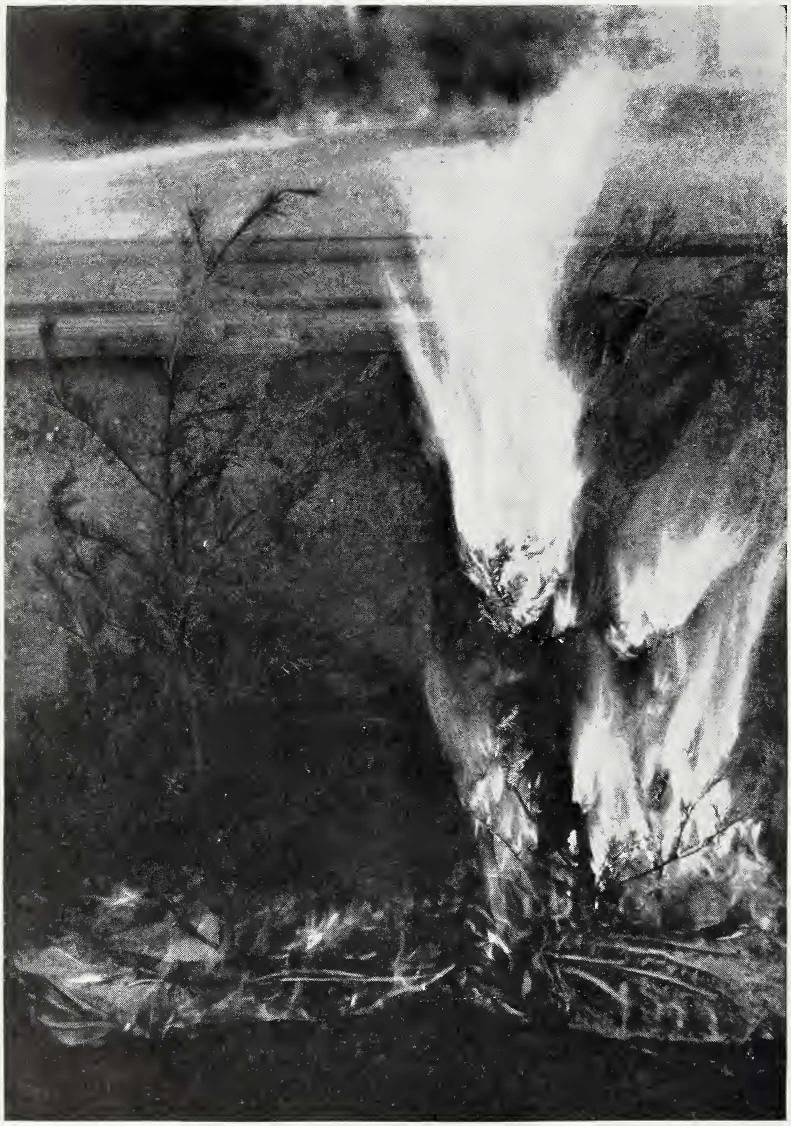
If the tree has been cut for some time, the solution may be taken up more readily if the stem is sawed off under water. A washtub or bathtub is usually large enough for this purpose. To keep the cut end wet, hold a piece of saturated cotton or fabric against it while transferring the tree to the solution.

The following example will make these directions clearer: Purchase a freshly cut tree 4 to 6 days before it is to be decorated for use and weigh it. If it weighs 8 pounds, 2 pounds of ammonium sulfate or calcium chloride is required. One and one-half times 2 equals 3, the number of pints of water required to make up the solution. Allowing for the space taken up by the trunk of the tree, a 2-quart container will suffice. Put the ammonium sulfate in the container, add the water, and stir until the chemical is all dissolved. Saw off the stem of the tree an inch or more from the end at an oblique angle, place the tree in an upright position with the freshly cut end in the solution, and leave in a cool place until needed.

Set the tree in a jar containing the fireproofing solution and leave in a cool place until most of the solution has been absorbed.

It should be strongly emphasized that the degree of fire resistance depends on the amount of the solution taken up by the tree. If the greater part of the solution is taken up, the tree will have a high degree of fire resistance. For best results all the solution should be absorbed before the tree is used. If the tree is cut too long a time before the treatment it will not absorb the solution and consequently cannot be made fire resistant by this method.

A word of caution should be added. A properly treated tree cannot be made to blaze even when exposed to a large flame, but a tree



An untreated Christmas tree (right) quickly caught fire from burning cotton around its base; the treated tree (left) did not burn.

that has not absorbed enough solution may be fire resistant in the sense that it cannot be ignited by a match or electric spark, and yet may catch fire from a large flame near it. It is customary to spread a layer of cotton under the Christmas tree to simulate snow. If this cotton should catch fire, it might easily ignite an incompletely treated tree; therefore cotton and other decorations used on or about a Christmas tree should be fireproof. Some stores now have fireproof cotton for sale, but if this cannot be obtained the cotton may be made fireproof by the following simple method.

Prepare a solution by dissolving 7 ounces of borax, 3 ounces of boric acid, and 1½ ounces of soap powder in 2 quarts of hot water. Place the cotton on a concrete floor or other surface which will not be injured by wetting and sprinkle with the solution while it is still warm. Let the cotton dry thoroughly, without handling, before using it. It is much easier to fireproof absorbent cotton than raw cotton, but if absorbent cotton is used the soap should be omitted.

Do not dip the cotton in the solution. This would remove its fluffiness and cause it to mat, making it unfit for use.

Directions for fireproofing curtains, clothes, and similar materials are given in Farmers' Bulletin No. 1786, which may be obtained free from the United States Department of Agriculture.

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